



Your Partner for Humidity and Flow Sensor Solutions

Mass Flow Meters for Gases

SENSIRION
THE SENSOR COMPANY

High Performance Gas Flow Measurement

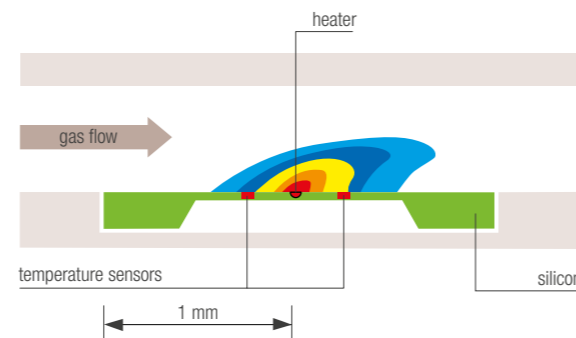
With our long history of designing mass flow solutions for medical technology and industrial automation, we are your ideal partner to support you in the development of new products. Sensirion offers mass flow meters for diverse applications. The mass flow meters ensure:

- Excellent repeatability
- Fast response time
- High sensitivity at low flows
- Wide dynamic range
- Reliability and robustness
- Bidirectionality

For more information, please visit: www.sensirion.com/massflowmeter

UNIQUE MEASUREMENT PROPERTIES

Sensirion's mass flow meters ensure fast, accurate and economical measurements of gas flow over a wide dynamic range. At the heart of every Sensirion mass flow sensor is a MEMS-based calorimetric microsensors, which measures the gas flow using the thermal measurement principle (see illustration). The sensor element is integrated with the signal conditioning electronics on a single chip. This unique technological approach – provided by innovative CMOSens® Technology – results in excellent performance and robustness at a very attractive cost. That is why today leading manufacturers rely on Sensirion's highly sensitive flow meters.



Customized Solutions

Our cutting-edge sensor technology enables us to meet complex requirements with innovative sensor solutions. Sensirion has the experience and capability to modify standard designs or develop new solutions tailored to your needs.

LOW PRESSURE DROP FLOW SENSORS

For gas flow measurement applications where only a small pressure drop is required, our technology allows customized solutions with flow elements that meet this requirement without compromising performance.

VARIOUS FLOW RANGES AND GASES

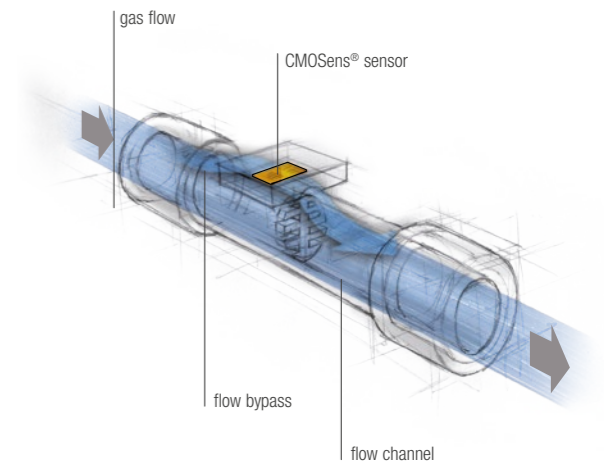
Depending on your application, Sensirion offers a large selection of flow rates and calibration with a variety of gases (multigas option).

AUTOCLAVABLE AND WASHABLE SOLUTIONS

Our robust technology enables autoclavable and washable flow sensor solutions that open up new possibilities, particularly in medical applications.

LOW-COST FLOW SENSOR SOLUTIONS

For less technically demanding requirements, customized sensors with a simple but effective housing and flow channel can be used as a basis for integration in low-cost systems or even in disposable measurement units.



SENSIRION – THE SENSOR COMPANY

Sensirion is the leading manufacturer of high-quality sensors and sensor solutions for the measurement and control of humidity, and gas and liquid flows. Founded in 1998 as a spin-off from the Swiss Federal Institute of Technology (ETH), the company is based near Zurich, Switzerland, and has offices in North America, South Korea, Japan, China and Taiwan. The head office in Switzerland is responsible for research, development and production.

Millions of Sensirion's sensor components and solutions are used all over the world. Customers in various industries, including demanding mass markets such as the automotive and medical industries, rely on our products. Sensirion's success is based on the innovative CMOSens® Technology, which combines sensor and analysis electronics on a single semiconductor chip. This enables the low-cost production of a large number of high-quality units, making Sensirion a preferred supplier of microsensors and sensor solutions. With locations around the world and a seamless distribution network, we can provide the highest level of customer support at every stage of a project. The many awards we have won demonstrate that we are prepared to go the extra mile for our customers. We received the Ernst & Young Entrepreneur of the Year® 2010 award, which is presented to companies that have made a contribution to the competitiveness of the Swiss economy by means of personal commitment and a willingness to take risks.

Medical

Gas Metering

Selection of Sensirion Mass Flow Meters



LOW PRESSURE DROP SFM3000

The SFM3000 measures the flow of air and other non-aggressive gases bidirectionally with a high degree of accuracy and very high update rate. The flow channel is designed to achieve a very low pressure drop through the sensor element. It outputs a 14-bit digital signal at a 2 kHz update rate, which is internally linearized and temperature compensated. The SFM3000 is particularly suitable for high-quality mass production and is the ideal choice for demanding and cost-sensitive applications in medical devices, such as ventilation and anesthesia, and in process automation and burner control.



ANALOG SFM3100

The SFM3100 is small, accurate and fast and can be easily integrated into existing devices. There is a temperature sensor in the gas channel of the flow meter. This enables highly precise temperature compensation and obviates the need to integrate a dedicated temperature sensor. The flow meter also detects negative flow ranges, thereby recognizing errors or impeded flows in a reliable manner. At the same time, multiple gases can be compensated with great precision. The flow rates and signal characteristics can be customized to meet customer-specific requirements. The SFM3100 is suitable for inspiration applications as well as for precise gas mixtures.



VERSATILE SFM4100

The SFM4100 is designed as a versatile OEM flow meter for measuring air and other non-aggressive gases with a high degree of accuracy. Compared with other thermal mass flow sensors (MEMS, hotwire or capillary), the SFM4100 features an extended dynamic range, higher long-term stability, better robustness and excellent repeatability. The sensor can be calibrated for use with multiple gases and various flow ranges. These characteristics make the SFM4100 a particularly valuable device in anesthesia equipment and medical ventilators.



EVALUATION KITS FOR EASY AND FAST TESTING

The EK-F3X and EK-F4X evaluation kits are test sets for Sensirion's SFM3000 and SFM4100 mass flow meters. Precise test measurements can be made quickly and inexpensively with these easy-to-use kits. Both evaluation kits consist of a USB stick with an adapter cable and are easy to connect to your computer via a USB port. The viewer software can be downloaded from our website. The software allows measuring at variable resolution and displays mass flow in standard liter per minute (slm). Data-logging is easy and can be exported to Excel.

	SFM3000	SFM3100	SFM4100
Flow range¹	-200...200 slm	-24...240 slm	0...20 slm
Accuracy, % FS²	0.05 %	0.01 %	0.15 %
Accuracy, % m.v.²	2.50 %	5 %	3 %
Repeatability, % FS³	0.025 %	0.025 %	0.025 %
Repeatability, % m.v.³	1 %	1.5 %	0.25 %
Pressure drop at full flow	< 6 mbar	< 13mbar	< 25 mbar
Interface	digital, I ² C	analog	digital, I ² C
Sampling time	0.5 ms	0.5ms	4.6 ms
Calibrated for	Air, N ₂ , O ₂	Air, N ₂ , O ₂	Air, N ₂ , O ₂ , N ₂ O, Ar, CO ₂
Power supply	5V	5V	3.5...9V
Max working pressure	1.3 bar	1.3 bar	10 bar
RoHS / REACH	✓	✓	✓

¹ slm = standard liters per minute

^{2,3} whichever is bigger

Fuel Cells

Analytical Instruments

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